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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Patent Department
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EXAMINER
MCKENZIE, THOMAS C

ART UNIT	PAPER NUMBER
1624	14

DATE MAILED: 10/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/514,023	GURTLER ET AL.	
	Examiner	Art Unit	
	Thomas McKenzie Ph.D.	1624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 July 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *43-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *43-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This action is in response to amendments filed on 7/24/02. Applicants cancelled all previously pending claims. Claims 43-55 are new. There are thirteen claims pending and under consideration. Claims 43-55 are synthesis claims. This is the third action on the merits. The application concerns a process of making cyclic allylic amines by a ring closing diene metathesis reactions conducted in ionic liquids. This action is made non-final because a new scope of enablement rejection concerning the catalysts is being made.

Response to Amendments

2. Applicants' new claims, drawn to the cyclization of α,ω-diene compounds bearing a nitrogen substituent clarifies the structure of the cyclic compounds they are preparing as discussed in point #3 of the previous action. The term α,ω-diene is art recognized to mean an alkene with a double bond at each terminus. The cyclic compounds thus, must be the cycloalkenes with an allylic amine group produced from these compounds. Both Acros Organics and Lancaster Synthesis sell cyclohex-2-enylamine. As such, the products of Applicants' process have an art-recognized use, since Applicants' products are protected forms of this commercially available compound. The Examiner assumes that other size cyclic amines are also useful and the enablement rejection made in point #16 of the previous action is withdrawn. Applicants' cancellation of claims 22 and 23 render

moot the indefiniteness rejections made in points #4 and #7. Applicants made no argument concerning the indefiniteness of "transition metal". However, the U.S. District Court Southern District of New York in *Corning Glass Works v. Sumitomo Electric USA Inc.* 5 USPQ2d 1545 held that it "was well known to those skilled in the art at the time of filing the application for the '550 patent, the expression "transition elements" in claim 1 refers to 3d transition metal ions -- i. e., ions having electrons in the 3d energy state or shell." Thus all the elements about which the Examiner asked are properly such metals. Thus, the phrase cannot be indefinite and the indefiniteness rejection made in point #5 is withdrawn. However, please see the enablement rejection made below.

Applicants' removal of formula (V) from the claims overcomes the indefiniteness rejection made in point #12. Applicants' cancellation of claims 35 and 37 render moot the indefiniteness rejection made in points #14 and #15. Applicants' restriction of the claimed subject matter to α,ω-diene compounds overcomes the obviousness rejections made in points #20 and #21. Campagne (Tet. Lett.) teaches only the use of diene compounds containing nitrogen atom within the chain.

Title

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following

is suggested: adding "α,ω-Diene" to the beginning.

Abstract

4. After the recent amendments, the abstract is too short and generic. Examiner suggests claim 43, including the figure, lines 1-13.

Claim Rejections - 35 USC § 112

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Claims 43-48, 54, and 55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrases "compounds that form transition metal carbenes under the reaction conditions" and "alkylating agents" and "substituent that is inert in the metathesis reaction" in claim 43 remain unduly functional. Applicants are attempting to define the structures of specific chemical compounds used in Applicants' claimed process. Names, structures, and chemical formulas precisely define organic molecules. Attempting to define structure by function is not proper when the structures can be clearly expressed in terms that are more precise. It is not sufficient to define a chemical structure solely by a chemical property. The skilled process chemist, who would use Applicants' invention, would not recongize what compounds would be claimed using this claim language.

6. Claims 43, 45, 46, and 49-55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "the heteroatom is selected from the group ..." in claim 43 indefinite for three reasons. Firstly, with the exception of "halogen" and "metal centers", none of the listed choices is a single atom, a required by the word "heteroatom". Secondly, "metal centers" is combined with "oxygen-containing heterocycles". Is this choice required to have both features? Is a "metal center" a single metallic atom or something else, like a metal binding site? Thirdly, the alkyl radicals, carbocyclic rings, germinal dialkyl groups, alkynes, and alkenes, offered as choices for the heteroatom, contain only carbon and hydrogen. Thus, they do not meet the art-recognized meaning of heteroatom.

7. Applicants have defined variable "R" in two different ways in lines six and line twelve in now combined claim 43.

8. The listed groups, in claim 43, "rings", acids", "esters", "ethers", ..."ammonium salts", "amides", "nitriles", "alkynes, alkenes", "halogen", "alcohols, ketones, aldehydes, carbamates, carbonates, urethanes, sulphonates, sulphones, sulfonamides", "organosilane units", and heterocycles" are indefinite. Firstly, all of these are molecules, not radicals with a free valance attachable to the

starting material. Secondly, are there any limitations as to what may be attached to the functional groups included in this list? For example, do "carboxylic acids" include only alkanoyl acids? On the other hand, are benzoic acid and nicotinic acid also intended? How is the "carboxylic acid " attached to the staring material, is it through the central atom of the functional group or might it be through a side chain? Is the radical HOC(O)- included? What ever choices Applicants make must be supported in the specification. Thirdly, what is a "unit"?

9. The phrase "organic substituent" in claim 43, line six is indefinite. All organic implies is the present of at least one carbon atom at an oxidation state lower than +4. Are there any limitations upon the structure of the substituent?

10. Claim 45 recites the limitation "n is 1 or 2". Claim 46 recites the limitation "n is 1". There is no antecedent basis for this limitation in claim 43 upon which these claims ultimately depends. Was dependency upon claim 44 intended?

11. Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The formula (VI) is shown as a +1 or +2 charged ion. The laws of chemistry require isolated compounds to be electrically neutral. The specification does not make clear what, if any, negatively charged

counter ions are intended. *Ex parte Diamond* 123 USPQ 167, *Ex parte Pedlow* 90 USPQ 395.

Applicants argue that the skilled chemist would know what required counter ion was intended and suggest the non-nucleophilic anions tetrafluoroborate and hexafluorophosphate would be so understood. This is not persuasive and these two specific anions would constitute new matter. In example 6, page 16 Applicants disclose a triflate counter anion. The value of m is taught in line 11, page 8 and a charged catalyst is pictured in line 18, although the Examiner can find no discussion in either place of any appropriate counter ion. While the two anions suggested are contained in the specification, they are in context of the solvent employed not the catalyst.

12. Claims 43, and 45-55 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for α,ω-diene compounds of formula (I), does not reasonably provide enablement for all α,ω-diene compounds. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

The how to make requirement of process claims concerns operability of the claimed process. The U.S. Court of Customs and Patent Appeals held *In re*

Marzocchi and Horton, 169 USPQ 367 that "a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of § 112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. Assuming that sufficient reason for such doubt does exist, a rejection for failure to teach how to make and/or use will be proper on that basis; such a rejection can be overcome by suitable proofs indicating that the teaching contained in the specification is truly enabling." In addition, "additional factors, such as the teachings in pertinent references, will be available to substantiate any doubts that the asserted scope of objective enablement is in fact commensurate with the scope of protection sought and to support any demands based thereon for proof. [Emphasis in original and footnote deleted]". This principle was affirmed in a chemical process case, *In re Armbruster*, 185, USPQ 152.

"The factors to be considered [in making an enablement rejection] have been summarized as the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples, the nature of the invention, the state of the prior art, the relative skill of those in that art, the

predictability or unpredictability of the art and the breadth of the claims." *In re Rainer*, 146 USPQ 218 (1965); *In re Colianni*, 195 USPQ 150, *Ex parte Formal*, 230 USPQ 546. Deterring if any particular substrate would react under Applicants conditions would require synthesis of the substrate and subjecting it to cyclization with a variety of claimed catalysts, a moderate degree of experimentation. The direction concerning the diene compounds is found in working Examples 2-4, all employing an identical diene. That is, there is only a single example of a compound of formula (I). The state of the art is summarized below. The artisan using Applicants invention would be a process chemist or pilot plant operator with a BS degree in chemistry and several years experience. The predictability in this art is discussed below.

There are three grounds for doubting operability. Firstly, the claimed process is catalytic and inherently understood to be unpredictable, *MOBIL OIL CORPORATION v. W.R. GRACE & COMPANY*, 180 USPQ 418, Merck *& Co. v. Olin Mathieson Chemical Corp.*, 253 F.2d 156, 164, 116 USPQ 484, 490 (4th Cir. 1958), *Corona Cord Tire Co. v. Dovan Chemical Corp.*, 276 U.S. 358, 368-369 (1928), *Application of Grant*, 304 F.2d 676, 679, 134 USPQ 248, 250-251 (CCPA 1962); *Rich Products Corp. v. Mitchell Foods, Inc.*, 357 F.2d 176, 181, 148 USPQ 522, 525-526 (2d Cir. 1966), cert. denied 385 U.S. 821, 151 USPQ 757 (1966);

Ling-Temco-Vought, Inc. v. Kollsman Instrument Corp., 372 F.2d 263, 268, 152 USPQ 446, 450-451 (2d Cir. 1967); *Georgia-Pacific Corp. v. United States Plywood Corp.*, 258 F.2d 124, 132-133, 118 USPQ 122, 128-129.

Secondly, the ring closing metathesis reaction appears to be capricious with regard to olefin substitution and subjected to unexpected and unexplained failures. Armstrong (J. Chem. Soc. Perkin I) has two tables on pages 384 and 386 with one column labeled "success" and the other "failure" for a series of identical functional groups, ring sizes, and catalysts with plenty of entries for both columns. Armstrong (J. Chem. Soc. Perkin I) says in section 3.2.1, page 373 referring to the ring closing metathesis reaction that "substrate double bonds are generally monosubstituted". Further stating that "di- or tri-substituted double bonds are metathesised by this catalyst", implying that such substituted double bond substrates are the exception and not the rule. In 3.3.1 on page 376, concerning a different catalyst, she says "[i]n all cases the alkene generated by the ring closure was disubstituted" meaning that only bis monosubstituted olefin substrates undergo ring closure. Do Applicants believe that any tetra-substituted olefin is capable of participating in the claimed process? Do Applicants believe that most tri and disubstituted olefins will cyclize with all the claimed "transition metal carbenes"?

Thirdly, Campagne (Tet. Lett.) in the scheme at the bottom of page 6177 makes the point that small changes in the protecting groups and oxidation state of substituents changes a process that is operative into one that is inoperative. Replacing the t-BOC group (-C(O)-$OC(CH_3)_3$) with trityl (-$C(C_6H_5)_3$) changes an inoperative process into an operative one, compounds 4 and 15. Replacing the t-BOC group (-C(O)-$OC(CH_3)_3$) with benzyl (-$CH_2C_6H_5$) changes an operative process into an inoperative one, compounds 7a and 7c, Table I, page 6176. Replacing the benzyl (-$CH_2C_6H_5$) with trityl (-$C(C_6H_5)_3$) changes it back into an operative one, compounds 7c and 7e. These examples involve changes in substituents, remote from the reaction site, and in atoms not undergoing any changes in bonding.

Applicants make three arguments. They correctly point out that the U.S. Court of Customs and Patent Appeals ruled in favor the applicants *In re Marzocchi and Horton*, 169 USPQ 367. For that matter, the court did so also *In re Armbruster*, 185, USPQ 152. Applicants also correctly assert that the Examiner did not address the factors to be considered in making an enablement rejection. Finally, Applicants assert that the Examiner did not supply any grounds for making the rejection.

This is not persuasive. Firstly, the factual situation is different in the present application from that of *In re Marzocchi and Horton*, 169 USPQ 367 and *In re Armbruster*, 185, USPQ 152. These cases are cited to provide the standard and processes for enablement rejections in chemical process applications. Secondly, the enablement factors are considered above. Thirdly, Armstrong (J. Chem. Soc. Perkin I) and Campagne (Tet. Lett.) were previously cited and Applicants have not explained why the cited examples from these references are either erroneous inappropriate to the present claims. The Examiner asked some specific questions concerning Applicants' claimed process. If Applicants cannot answer the questions, why should the public understand that the entire claimed process is workable?

13. Claims 43-48, 54, and 55 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for osmium, ruthenium, and molybdenum catalysts, does not reasonably provide enablement for all transition metals generally. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. As discussed above in point #2, Applicants claim 43 includes carbenes of lanthanides, actinides, the trans uranium metals, and the element actinium, with no known stable isotopes. There are no

directions given for either preparing or using such catalysts in the specification. The case law, discussed above, makes such catalytic claims inherently suspect.

Conclusion

14. Please direct any inquiry concerning this communication or earlier communications from the Examiner to Thomas C McKenzie, Ph. D. whose telephone number is (703) 308-9806. The FAX number for before final amendments is (703) 872-9306. The Examiner is available from 8:30 to 5:30, Monday through Friday. If attempts to reach the Examiner by telephone are unsuccessful, you can reach the Examiner's supervisor, Mukund Shah at (703) 308-4716. Please direct general inquiries or any inquiry relating to the status of this application to the receptionist whose telephone number is (703) 308-1235.

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TCMcK
October 2, 2002